Water Management Under Alternative Plausible Futures

Improvements to analytical tools allow the Water Plan to begin to evaluate the performance of resource management strategies in light of many future risks and uncertainties

Presentation Overview

- Vision for analytical tool improvements
- Results from Update 2009
- Stakeholder feedback
- Enhancements for Update 2013

Vision & Purpose
for Analytical Tool and Data Improvements

- Vision
- Update 2009
- Stakeholder feedback
- Update 2013 enhancements

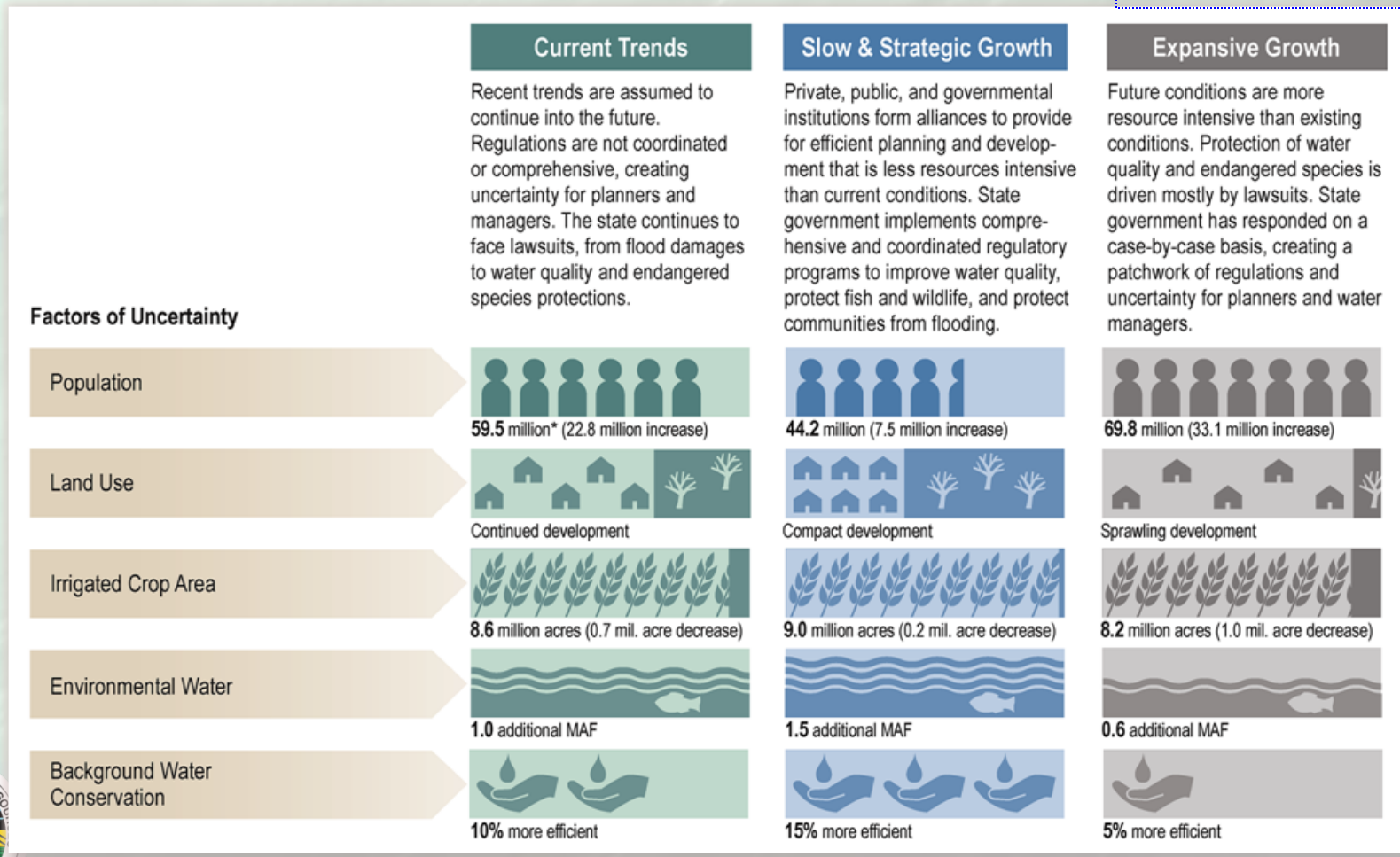
- Support decision making in light of uncertainties
  - Promote collaborative decision making, Shared Vision Planning
- Support integrated water management regionally and statewide
  - Supply reliability, flood management, environmental restoration, water quality, economic efficiency, social equity

Desired Water Plan Quantitative Deliverables (Phased Approach)

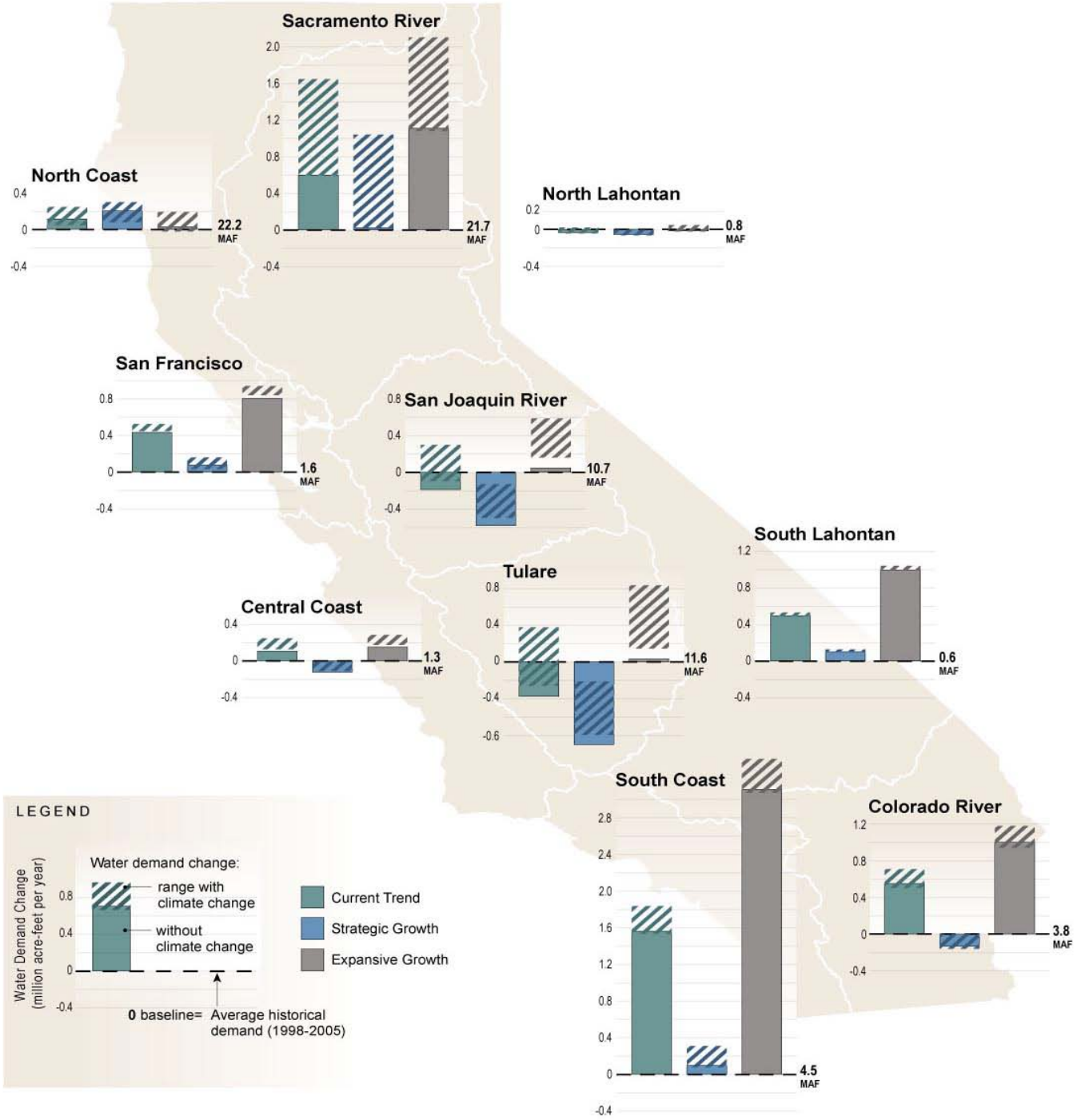
- Accurately describe recent water management conditions (Water Portfolios)
- Develop multiple baseline future conditions (Scenarios)
- Identify alternative water management response packages (management strategies)
- Evaluate performance of strategies in terms of benefits, costs, and tradeoffs
- Evaluate interaction between local, regional, and statewide water management
- Support Water Planning Information Exchange

Update 2009 Scenarios

- Vision
- Update 2009
- Stakeholder feedback
- Update 2013 Enhancements



Update 2009 Regional Water Demand Changes By Scenario



Resource Management Strategies (Update 2009)
A Range of Choices

Reduce Water Demand
- Agricultural Water Use Efficiency
- Urban Water Use Efficiency

Improve Operational Efficiency & Transfers
- Conveyance – Delta
- Conveyance – Regional / Local
- System Reoperation
- Water Transfers

Increase Water Supply
- Conjunctive Management & Groundwater Storage
- Desalination –Brackish & Seawater
- Precipitation Enhancement
- Recycled Municipal Water
- Surface Storage – CALFED
- Surface Storage – Regional / Local

Improve Flood Management
- Flood Risk Management

Improve Water Quality
- Drinking Water Treatment & Distribution
- Groundwater / Aquifer Remediation
- Matching Quality to Use
- Pollution Prevention
- Salt & Salinity Management
- Urban Runoff Management

Practice Resource Stewardship
- Agricultural Lands Stewardship
- Economic Incentives (Loans, Grants & Water Pricing)
- Ecosystem Restoration
- Forest Management
- Land Use Planning & Management
- Recharge Areas Protection
- Water-Dependent Recreation
- Watershed Management

Other-- Crop idling, dew vaporization, fog collection, irrigated land retirement, rainfed agriculture, waterbag transport

- Vision
- Update 2009
- Stakeholder feedback
- Update 2013 Enhancements

Stakeholder Outreach

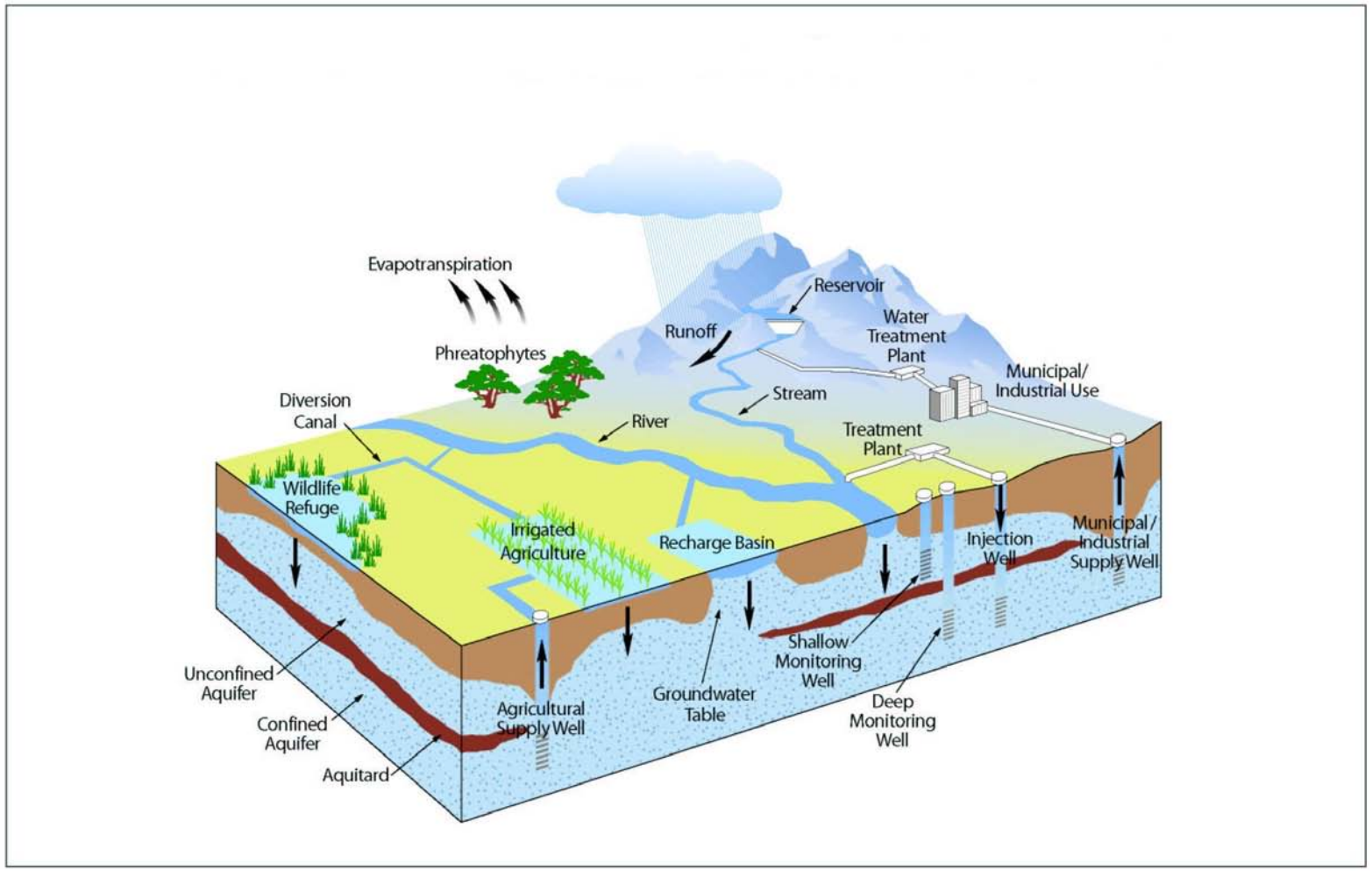
- SWAN Workshop – August 2010
  - o Received advice on desired technical enhancements
- Advisory Committee – March 2011
- SWAN Workshop – May 2011
  - o Shared results of sample analysis
- Focus group – June 2011
  - o 2 meetings with a cross section of people that worked off-line to provide feedback on the presentation being given today

Stakeholder feedback

- Evaluate how factors like climate, land use decisions and population interact to affect future water use
- Evaluate how resource management strategies perform under alternative plausible futures
  - Quantify costs, benefits, tradeoffs, and vulnerabilities

Improvements to analytical tools allow for more comprehensive evaluation

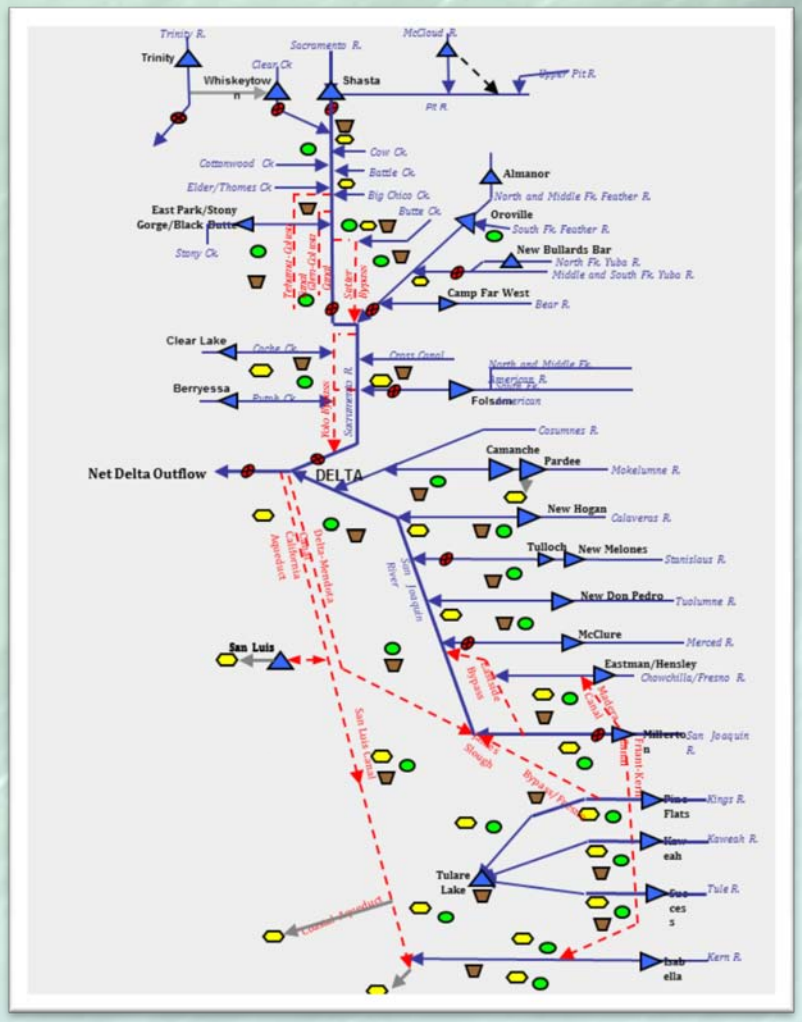
- Vision
- Update 2009
- Stakeholder feedback
- Update 2013 Enhancements



Water Evaluation And Planning (WEAP) Model

Integrates Hydrology and Water Management

- Monthly temperature and precip. drive rainfall/runoff model
- Indoor demands:
  - Households / employees
- Irrigation demands:
  - monthly climate
  - land use patterns
- Network of rivers, reservoirs, conveyance, groundwater basins
- Linear program routes supplies to demand nodes according to supply preferences and priorities



Summary of analytical approach

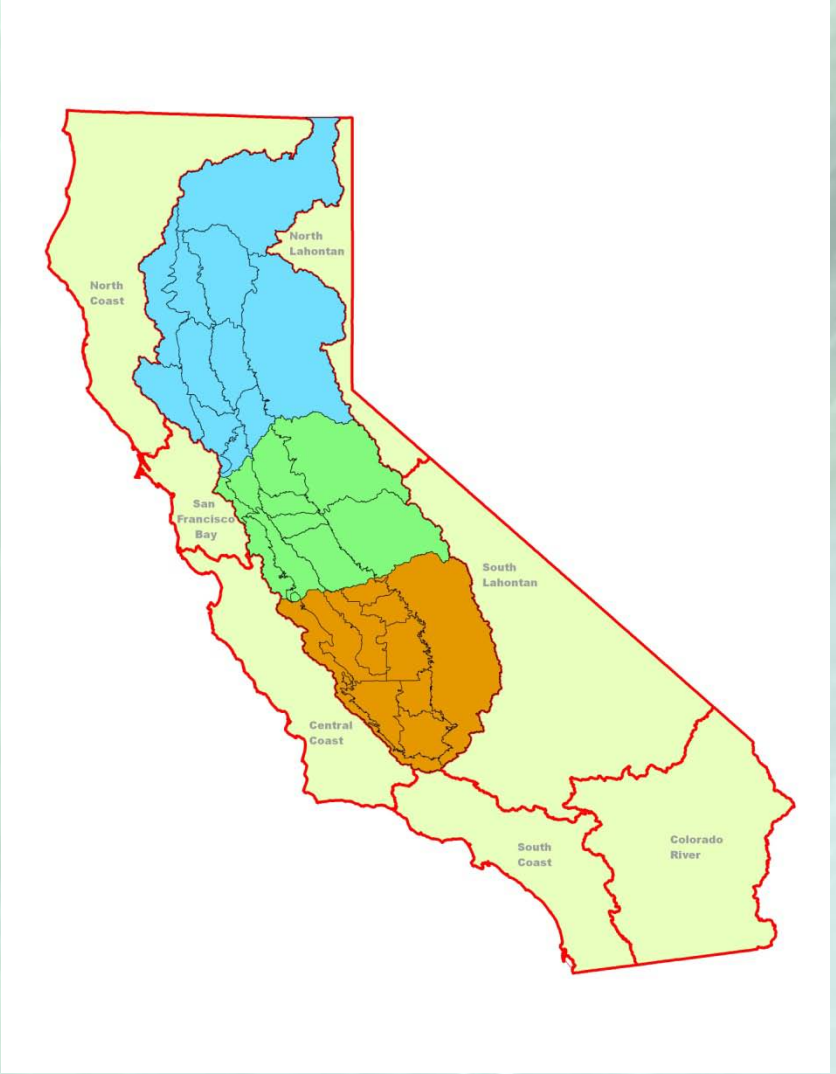
- Apply an iterative, analytic approach that:
  - Considers *uncertainty* that is not easily characterized statistically
    - Future climate, land uses, environmental regulations
  - Systematically evaluates *options* to increase robustness of current strategies
    - Analysis guides development of new, adaptive strategies
  - Quantifies outcomes across broad array of *metrics*
    - Accommodates wide range of objectives and values over outcomes

Describing Alternative Plausible Futures

External Factors	Resource Management Strategies
Population Climatic conditions	Existing tools capable of quantifying strategies that •Reduce water demand •Improve operational flexibility & transfers •Increase water supply
Analytical Tools	**Sample Performance Measures**
Water Evaluation and Planning (WEAP) model Planning Area scale for Central Valley Regions	•Supply Reliability (Urban & Agriculture) •Environmental flows •Groundwater levels •Strategy cost

Limitations for Update 2013 Analysis

- Resource limitations restrict more comprehensive analysis to three regions in Central Valley
  - Phased approach
- Cannot represent all strategies or quantify all strategy benefits
- Coarse representation of regional groundwater and surface water systems
- Use monthly rainfall-runoff, water use, and water system operations data



Areas Outside of Sacramento River, San Joaquin River and Tulare Lake Regions

- Apply simpler Hydrologic Region model developed for Update 2009
- Quantify regional water demand
  - Update 3 growth scenarios
  - Update 12 climate scenarios
- Ability to include some demand management strategies

Schedule

- Summer/Fall 2011 – regional outreach
- Fall/Winter 2011/2012 – Implement proof of concept
- 2012 – Scenario refinement and outreach
- 2013 – Complete Scenarios

Next Steps

- Form a Water Plan caucus group or workshops to discuss policy relevance of technical analysis of water management under alternative plausible futures
  - Interested?
  - Contact juricich@water.ca.gov
- Begin regional outreach to identify and quantify regional resource management strategies

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